

CLAIMS

1. A tool insert comprising:

a substrate;

a layer of ultra-hard abrasive material bonded to the substrate, the layer of ultra-hard abrasive material having a side surface and a top surface, a portion of the periphery of the top surface of the ultra-hard abrasive material providing a primary cutting edge for the tool insert; and

a protective layer, a surface of the protective layer being bonded to the top surface and/or the side surface of the ultra-hard abrasive material so as to protect the primary cutting edge thereof, a periphery of the protective layer providing a secondary cutting edge for the tool insert, the depth of the protective layer being selected so as to be sufficient to protect the primary cutting edge whilst cutting, milling or drilling a window through a first substance but to expose the primary cutting edge upon encountering a second substance.

2. A tool insert according to claim 1, wherein the substrate is a tungsten carbide substrate.
3. A tool insert according to claim 1 or claim 2, wherein the protective layer is integrally formed with the substrate and is formed of the same material as the substrate.
4. A tool insert according to claim 1 or claim 2, wherein the protective layer is formed as a separate component *in situ*.
5. A tool insert according to claim 1 or claim 2, wherein the protective layer is formed as a separate component which is bonded to the top surface and/or the side surface of the ultra-hard abrasive material.

6. A tool insert according to any one of the preceding claims, wherein the protective layer is provided in the form of a ring which is located about the periphery of the layer of ultra-hard abrasive material.
7. A tool insert according to any one of claims 1 to 5, wherein the protective layer is an overlayer bonded to the top surface of the ultra-hard abrasive material.
8. A tool insert according to any one of claims 1 to 5, wherein the protective layer forms a segment which is bonded to the substrate adjacent the layer of ultra-hard abrasive material.
9. A tool insert according to any one of claims 1 to 5, wherein a plurality of alternating ultra-hard abrasive material strips and protective layer strips are located on the substrate, the successive strips of ultra-hard abrasive material providing a series of primary cutting edges and the successive protective layer strips providing a series of secondary cutting edges.
10. A tool insert according to any one of the preceding claims, wherein the protective layer is formed of the same type of material as the substrate but of a different grade to that of the substrate, or of tool steel or of another suitable material dependent on the first substance.
11. A tool insert according to any one of the preceding claims, wherein the first substance is a casing or lining of a borehole or shaft in a bedrock and the second substance is the bedrock.
12. A method of drilling a horizontal or angled hole in a subterranean rock formation includes the steps of:

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- 1) preparing the site for horizontal or angled drilling by a) using an existing borehole or, if not available, drilling a borehole into a subterranean rock formation to an appropriate depth and b) lining the borehole, at least in the region where horizontal or angled drilling is to take place, with a casing or lining having a passage and a deflector means mounted in the passage;
- 2) providing a drill bit with at least one cutting tool insert, the or each cutting tool insert comprising a substrate, a layer of ultra-hard abrasive material bonded to the substrate, the ultra-hard abrasive material providing a primary cutting edge for the tool insert, and a protective layer for protecting the primary cutting edge and for providing a secondary cutting edge;
- 3) guiding the drill bit down the borehole until it contacts the deflector and is deflected towards the casing or lining;
- 4) milling a window through the casing or lining to the subterranean rock formation; and
- 5) drilling a hole in the subterranean rock formation,

wherein the depth of the protective layer is such as to protect the primary cutting edge whilst milling through the casing or lining and to expose the primary cutting edge upon encountering the subterranean rock formation.

13. A method according to claim 12, which is used for the drilling of multiple directional holes from a central vertical borehole.

14. A method according to claim 12 or claim 13, wherein the cutting tool insert is as defined in any one of claims 1 to 11.